

Clinical Outcomes after Transcatheter Aortic Valve Implantation in Nonagenarian Patients: A Retrospective Population-Based Cohort Study

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INTRODUCTION

Transcatheter aortic valve implantation (TAVI) has emerged as first choice for severe aortic stenosis (AS) in patients older than 75 years for all surgical risks [1], as well as in inoperable or high surgical risk patients [2], including nonagenarians [3]. Invasive treatments of these very elderly raise several ethical, financial, and procedural issues. Current data on the effectiveness and clinical outcomes of TAVI in this aged group remain limited, with unclear benefits and potential futility of the procedure in nonagenarians.

OBJECTIVES

To compare the overall survival and the risk of all-cause and heart failure-specific hospitalization in nonagenarian patients hospitalized for symptomatic severe aortic stenosis (AS) who underwent transcatheter aortic valve implantation (TAVI) or conservative treatment in the Lombardy Region.

METHODS

This population-based retrospective cohort study was entirely based on healthcare utilization databases of the Italian region of Lombardy. The cohort included all nonagenarians hospitalized for AS between 2017 and 2021, who underwent TAVI within 90 days from first diagnosis or conservative treatment. The association between TAVI and clinical outcomes was assessed through Cox or Fine&Grey regression models. Given that patients exposed to TAVI are likely to have a more

favorable clinical profile compared to unexposed patients, two different comparative analyses were conducted. First, since the baseline characteristics were restricted to specific measurable variables (age, sex, comorbidities and co-treatments summarized in the MCS [4]), the comparison could have been influenced by residual unmeasured confounding. To address this potential bias, a semi-automated data-adaptive high-dimensional propensity score (HDPS) approach was employed to reduce potential founding by indication [5]. Second, administrative data may not fully capture the clinical heterogeneity between exposed and unexposed patients, and unexposed patients are likely to have a higher mortality rate within the first months after the diagnosis of severe aortic valve stenosis. Thus, an additional analysis was conducted on patients who survived the first six months of follow-up.

RESULTS

Overall, 16,848 nonagenarians hospitalized for AS were identified. Among these, 320 patients underwent TAVI. In the unmatched cohort, patients who underwent TAVI were younger, more frequently males, and exhibited a more favorable clinical profile compared to those who were unexposed to TAVI. In the HDPS analysis, 193 patients exposed to TAVI were matched to as many control patients. The 2-year survival rates were 76.0% and 37.7%, respectively, in TAVI and control patients, corresponding to an HR of 0.24 (95% CI 0.15–0.37). When excluding patients who died within the first 6 months of follow-up, a significantly higher survival was still observed among TAVI patients (HR 0.27, 95% CI 0.16–0.47). The 2-year cumulative incidence of all cause re-hospitaliza-

tion was higher during the first six months, being 47.4 % and 34.7 %, respectively. Rehospitalization for heart failure was 11.1 % and 26.5 %, respectively, corresponding to an HR of 0.64 (95% CI 0.40–0.99).

CONCLUSIONS

This study further supports the usefulness of TAVI in nonagenarians, as it showed to improve their survival rate, reduce their risk of rehospitalization, and likely increase their quality of life.

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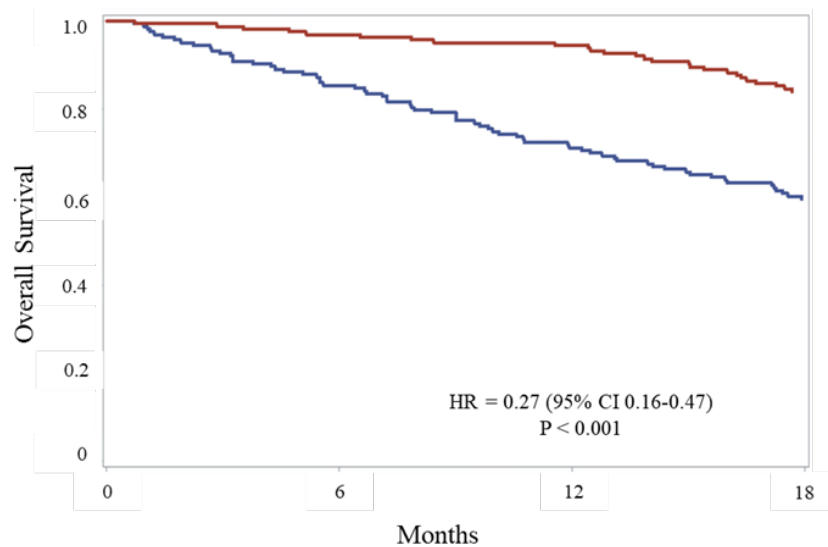


Figure 1. Overall survival of patients who did (red line) or did not (blue line) undergo transcatheter aortic valve implantation (TAVI) in the high-dimensional propensity score (HDPS) the matched cohort that only included patients who survived the first six months of follow-up.